

AMENDMENTS TO THE CLAIMS

The claims in this listing will replace all prior versions, and listings, of claims in the application.

1 (Currently Amended) A polar-axis telescope incorporated in an equatorial telescope comprising:

an objective lens that forms an object image;

a focal plate that is arranged located on a focal plane of said objective lens;

an eyepiece that is arranged backward located on an opposite side of said focal plate with respect to said objective lens and that forms an observed image;

a zoom optical system that is arranged located between said objective lens focal plate and said eyepiece, and that makes the observed image appear gradually bigger while maintaining an in-focus situation condition and that relays the object image formed on said focal plate to said eyepiece; and

a zoom optical system driver that shifts said zoom optical system along a polar-axis, corresponding to an optical axis of said polar-axis telescope, so as to change a magnification.

2 (Canceled)

3 (Currently Amended) The polar-axis telescope of claim 1, wherein said zoom optical system driver comprises includes a cam mechanism that comprises a cam tube, a guiding tube arranged coaxial to said cam tube, and a cam follower connected to said cam tube and said guiding tube, said cam mechanism

shifting said zoom optical system along the polar-axis in accordance with a rotation of said cam tube.

4 (Currently Amended) The polar-axis telescope of claim 3, further comprising a scale ring that is operatively connected to said guiding tube and that is rotatable around the polar-axis relative to said cam tube, to adjust a position of a scale formed on said focal plate;

wherein said focal plate is operatively connected to said guiding tube, and rotates around the polar-axis by ~~rotating~~ rotation of said scale ring so as to set the scale to a position corresponding to a present observed time.

5 (Previously Presented) The polar-axis telescope of claim 3, wherein said eyepiece is operatively connected to said guiding tube such that said eyepiece does not rotate in accordance with the rotation of said cam tube.

6 (Previously Presented) The polar-axis telescope of claim 3, further comprising a zoom operation member that rotates said cam tube in accordance with an operation of said zoom operation member.

7 (Original) The polar-axis telescope of claim 6, wherein said zoom operation member is ring-shaped and is arranged adjacent to said eyepiece relative to said zoom optical system.

8 (Original) The polar-axis telescope of claim 6, further comprising a spacer that is arranged between said guiding tube and said cam tube to adjust a position of said cam tube along the polar-axis relative to said guiding tube.

9 (Currently Amended) The polar-axis telescope of claim 6, further comprising a nut that engages with an outer surface of said guiding tube, and

that is arranged backward of said zoom operation member so as to press said zoom operation ring, said nut being ~~screwed~~ turned to adjust a rotation-resistance of said zoom operation ring.

10 (Currently Amended) The polar-axis telescope of claim 1, wherein said zoom optical system driver comprises:

a cam tube that accommodates said zoom optical system, and has a moving channel formed on said cam tube;

a guide tube that is coaxially arranged around said cam tube, and that has a guiding channel that guides said zoom optical system along a polar-axis, said cam tube being rotatable around the polar-axis relative to said guiding tube, said guiding tube being ~~held~~ restrained so as not to rotate while said cam tube rotates; and

a cam follower that is operatively connected to said zoom optical system and that transmits the ~~rotation-motion~~ rotational-motion of said cam tube to said guide ring.

11 (Currently Amended) The polar-axis telescope of claim 10, wherein said guiding channel is formed along the polar-axis, said moving channel being formed in a slant direction skewed with respect to the polar-axis so as to draw define a helical line around said polar-axis, said cam follower moving along the guiding channel.

12 (Original) The polar-axis telescope of claim 1, wherein said zoom optical system comprises an erecting optical system.

13. (Original) The polar-axis telescope of claim 1, wherein said zoom optical system comprises a condenser lens, a first zoom lens, and a second zoom lens, said first and second zoom lens moving along the polar-axis.

14. (Original) The polar-axis telescope of claim 1, wherein said zoom optical system comprises a relay optical system.

15. (Currently Amended) An equatorial telescope mount comprising:
a polar-axis telescope that comprises an objective lens, a focal plate, and an eyepiece for forming an observed image;

a polar-axis outer tube that adjusts the azimuth and altitude of said polar-axis telescope;

a polar-axis inner tube that is provided in said polar-axis outer tube and that is rotatable around the polar-axis relative to said polar-axis outer tube, said polar-axis telescope being installed in said polar-axis inner tube; and

a declination outer tube that is operatively connected to said polar-axis inner tube and that is rotatable around the polar-axis relative to said polar-axis outer tube;

wherein said polar-axis telescope comprises:

a zoom optical system that is arranged located between said objective lens focal plate and said eyepiece, and that makes the observed image appear gradually bigger while maintaining an in-focus situation condition and that relays the object image formed on said focal plate to said eyepiece; and

a zoom optical system driver that shifts said zoom optical system along a polar-axis, corresponding to an optical axis of said polar-axis telescope, so as to change a magnification.

16. (New) The equatorial telescope mount according to claim 15, wherein said zoom optical system driver comprises a cam mechanism that includes a cam tube, a guiding tube coaxially positioned with respect to said cam tube, and a cam follower connected to said cam tube and to said guiding tube, said cam mechanism shifting said zoom optical system along the polar axis in accordance with a rotation of said cam tube.

17. (New) The equatorial telescope mount according to claim 16, further comprising a zoom operation member that rotates said cam tube.

18. (New) The equatorial telescope mount according to claim 15, wherein said zoom optical system comprises an erecting optical system.

19. (New) The equatorial telescope mount according to claim 15, wherein said zoom optical system comprises a condenser lens, a first zoom lens, and a second zoom lens, said first and second zoom lenses moving along the polar axis.

20. (New) The equatorial telescope mount according to claim 15, wherein said zoom optical system comprises a relay optical system.

21. (New) A polar axis telescope for use in an equatorial telescope, said polar axis telescope comprising:

an objective lens that forms an image of an object;

a focal plate that is located on a focal plane of said objective lens;

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an eyepiece that is located on an opposite side of said focal plate with respect to said objective lens and forms an observed image;

a zoom optical system that is located between said objective lens and said eyepiece, said zoom optical system configured to make the observed image appear gradually larger while maintaining an in-focus condition; and

a zoom optical system driver that shifts said optical system along a polar axis corresponding to an optical axis of said polar axis telescope so as to change a magnification, said zoom optical system driver comprising a cam mechanism that includes a cam tube, a guiding tube arranged coaxially to said cam tube and a cam follower connected to said cam tube and to said guiding tube, said cam mechanism shifting said zoom optical system along the polar axis in accordance with a rotation of said cam tube.